

**Bremerton  
Kitsap County  
Health District**

**Scott W. Lundquist, MD, MPH, Director**  
109 Austin Drive  
Bremerton, WA 98312

March 1, 2002

Ms. Judy Aitken  
Department of Ecology - NWRO  
Toxics Cleanup Program  
3190 160th Avenue SE  
Bellevue, WA 98008-5452

**RECEIVED**  
**MAR 04 2002**  
**DEPT OF ECOLOGY**

RE: USN BREMERTON AUTO WRECKING LANDFILL SITE HAZARD ASSESSMENT  
FILE DOCUMENTATION

Dear Judy,

An updated site hazard assessment (SHA) recommendation is attached to this letter. A review of the package after I sent it to you revealed some small problems in the scoring. These items have been corrected in this version. These corrections resulted in no change to the final scoring recommendation of 1. If you have any questions or require further information please feel free to contact me at (360) 692-3611 ext. 241.

Sincerely,



Grant A. Holdcroft, R.S.  
Environmental Health Specialist  
Solid and Hazardous Waste Program

enc: USN Bremerton Auto Wrecking Landfill Scoring Worksheets

rte: Jan Brower, BKCHD  
Project file SHA 3.1

gah/swwqbd/shw/common/sha/sites/baw/baw/cov/let2.doc

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**POULSBO ANNEX**  
**Environmental Health Division**  
19540 Front Street  
Mailing Address: P.O. Box 1076 - Poulsbo, WA 98370-0050  
(360) 692-3611 FAX (360) 692-6684

**SITE HAZARD ASSESSMENT**  
**USN Bremerton Auto Wrecking Landfill**

February 26, 2002

Site Assessed for the February 26, 2002, Site Register

**Site Name/Location** (Street, City, County, Section /Township/Range, Facility ID Number):

USN Bremerton Auto Wrecking Landfill  
4275 State Route 3  
Port Orchard, WA 98367

Township: 23N  
Range: 1W  
Section: 1  
Longitude: 122° 44' 29.4"  
Latitude: 47° 30' 36.4"

Facility ID No. 62752314

**Site Description** (Include management areas, substances of concern, and quantities):

This site was listed on the Washington State Department of Ecology's (Ecology) Integrated Site Information System (ISIS) list in December 1997, after a review of the files performed by the Bremerton-Kitsap County Health District (Health District), and recommendations made to Ecology's Northwest regional office. The site is currently an undeveloped property with piles of waste composition roofing material, lumber, and other demolition debris on top of the landfill. The entire site is vegetated. The site is located adjacent to Airport Auto Wrecking, Too (Facility ID# 34492328), an active auto wrecking operation.

**Historic Activities**

The site is a closed and abandoned unlined, mixed municipal solid waste landfill that operated from 1968 to 1989. The landfill was sited in a ravine that Gorst Creek currently flows through. Gorst Creek is a salmon stream and 2.5 miles from the landfill empties into Sinclair Inlet of Puget Sound. During the start of fill operations a culvert was installed and the creek was piped under the landfill. The site received mixed municipal waste from the public and the United States Navy (USN) from the Puget Sound Naval Shipyard. Estimates from Health District records indicate that the landfill may hold as much as 30,000 cubic yards of waste.

**Recent Site Activities**

In March 1997 Health District staff discovered a slide from the south west corner of the landfill into Gorst Creek. The slide exposed waste on the face of the slope and dumped waste into the creek. The Health District worked with the owners of the site, the Washington State Department of Transportation (DOT), the US Navy, and other parties to stabilize the slope and remove waste from the creek. Sampling of the creek was conducted by the DOT in April 1997, and in October

2000 a site hazard assessment (SHA) was conducted by Hart Crowser for the Navy. The Health District has made numerous visits to the site over the last four years checking on the condition of the slope and stability. A major slope failure would threaten State Route 3 by blocking the culvert that runs under that road.

### Sampling Summary

For this SHA no sampling was conducted by the Health District. Analytical results from the sampling conducted by DOT and the Navy were used for this SHA. The sampling results from the two studies indicate that Polychlorinated Biphenyls (PCBs), DDT, Mercury, and Polycyclic Aromatic Hydrocarbons (PAHs) were found above applicable standards in the surface water, sediment, and soil at the site. Table 1. below shows the sampling study, contaminants, level, and the applicable standard.

Study	Sample	Contaminant	Matrix	Result	Standard	Regulatory Level
DOT <sup>1</sup>	SC1	PCBs	Sediment	1.21 ppm	FSQV <sup>2</sup>	0.021 ppm
"	CD2	PCBs	Sediment	0.41 ppm	FSQV	0.021 ppm
Hart Crowser <sup>3</sup>	GL-Sed-02	DDT	Sediment	0.012 ppm	FSQV	0.0016 ppm
"	GL-SW-01	Mercury	Ground Water	0.2 ppb	WAC 173-201A <sup>4</sup>	0.012 ppb
"	GL-SS-01	Benzo(a)anthracene	Soil	0.15 ppm	MTCA A <sup>5</sup>	0.1 ppm
"	GL-SS-01	Benzo(a)pyrene	Soil	0.14 ppm	MTCA A	0.1 ppm
"	GL-SS-01	Benzo(b)fluoranthene	Soil	0.12 ppm	MTCA A	0.1 ppm
"	GL-SS-02	Chrysene	Soil	0.18 ppm	MTCA A	0.1 ppm
"	GL-SS-07	Benzo(b)fluoranthene	Soil	0.4 ppm	MTCA A	0.1 ppm
"	GL-SS-07	Benzo(k)fluoranthene	Soil	0.4 ppm	MTCA A	0.1 ppm

**Table 1. Contaminants that Exceed Standards**

In addition, other substances were identified at the site. They are arsenic, cadmium, copper, lead, nickel, zinc, bis(2-Ethylhexyl)phthalate, butylbenzylphthalate, and Total Petroleum Hydrocarbons- diesel and heavy oil.

<sup>1</sup> Washington State Department of Transportation letter and analytical results from Darin Cramer to Michelle Miller dated April 17, 1997.

<sup>2</sup> Freshwater Sediment Quality Values from Creation and Analysis of Freshwater Sediment Quality Values in Washington State, Department of Ecology, July 1997

<sup>3</sup> Site Hazard Assessment, Gorst Landfill, Gorst, WA by Hart Crowser, October 13, 2000.

<sup>4</sup> WAC 173-201A Water Quality Standards – Surface Waters – Freshwater -Chronic

<sup>5</sup> WAC 173-340 Model Toxics Control Act – Table 740-1 Method A Soil Cleanup Levels for Unrestricted Landuses

### **Drinking Water/Ground Water**

There are approximately 1000 residences that have drinking water supplied from two public drinking water wells within 1000 feet of the site. Down gradient of the site are three drinking water wells that supply the City of Bremerton. These wells are approximately 1.25 miles from the site and the site has been determined to be in the within the 5 year travel time to the well. Groundwater in the area travels predominantly to the northeast. The three production wells lie to the direct northeast of the landfill site. The approximate number of persons that have drinking water supplied from these wells is 10,000.

**Special Considerations** (Include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site.)

The 1997 slope failure of the landfill was a result of partial blockage of the culvert beneath the landfill. Backed up stormwater that could not drain through the culvert ran over the top of the landfill causing the slope to saturate and collapse into the ravine where the downstream culvert daylighted. Landfill waste and soil were deposited in Gorst Creek and along its banks.

The collapse of the slope above Gorst Creek on the downhill side would block the culverts under State Route 3 and possibly cause the road to be washed out.

### **ROUTE SCORES:**

Surface Water/Human Health:	<u>45.1</u>	Surface Water/Environ:	<u>77.0</u>
Air/Human Health:	<u>9.7</u>	Air/Environmental:	<u>19.6</u>
Groundwater/Human Health:	<u>49.6</u>		

OVERALL RANK: 1



**WORKSHEET 4**  
**SURFACE WATER ROUTE**

**1.0 SUBSTANCE CHARACTERISTICS**

**1.1 Human Toxicity**

Substance	Drinking Water Standard	Val.	Acute Toxicity	Val.	Chronic Toxicity	Val.	Carcinogenicity		
	(ug/l)		(mg/kg-bw)		(mg/kg/day)		WOE	PF	Val.
lead	5	8	ND	ND	ND	ND	ND	ND	ND
cadmium	5	8	225	5	0.0005	5	B1	0.13	ND
benzo[a]anthracene	0.2	10	ND	ND	ND	ND	B2	11.5	7
benzo[b]fluoranthene	0.2	10	ND	ND	ND	ND	B2	11.5	7
PCBs	0.5	10	1315	3	ND	ND	B2	7.7	6

Source: 1, 4

Highest Value: 10

2 Bonus Points? 2

Final Toxicity Value 12

**1.2 Environmental Toxicity**

	( X ) Freshwater							
	( ) Marine							
	Acute Criteria		Non-human Mammalian Acute Toxicity			Source: 4	Value: 8	
Substance	(ug/l)	Val.	(mg/kg)	Val.				
lead	82	6						
cadmium	3.9	8						
PCBs	2	8						
mercury	2.4	8						

**1.3 Substance quantity**

Explain basis: Surface area approximately 1.9 acres

Source: 1 Value: 8

**2.0 MIGRATION POTENTIAL**

**2.1 Containment**

Explain basis: no run-on/runoff control

Source: 1,3 Value: 10

2.2 Surface Soil Permeability: piped to , adjacent to surface water

Source: 1,3,8 Value: 7

2.3 Total Annual Precipitation: 56 inches/year

Source: 3,5a Value: 4

2.4 Max. 2-Yr/24-hour Precipitation: 3 inches

Source: 3 Value: 3

2.5 Flood Plain: Not in a flood plain

Source: 1 Value: 0

**WORKSHEET 4 (CONTINUED)**  
**SURFACE WATER ROUTE**

2.6 Terrain Slope: >8%

Source: 1 Value: 5

**3.0 TARGETS**

3.1 Distance to Surface Water: (<1,000 feet)

Source: 1 Value: 10

3.2 Population Served within 2 miles: None.

Source: 1,7 Value: 0

3.3 Area Irrigated within 2 miles: None. Due to heavy rainfall in the area

Source: 1 Value: 0

3.4 Distance to Nearest Fishery Resource: <1,000 ft

Source: 7 Value: 12

3.5 Distance to, and Name (s) of, nearest Sensitive  
Environment (s): Less than 1,000 ft for fisheries resource

Source: 1 Value: 12

**4.0 RELEASE**

Explain basis for scoring a release to surface  
water: confirmed release to surface waters/ contaminated sediment

Source: 1 Value: 5

# WORKSHEET 5 AIR ROUTE

## 1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction (WARM Scoring Manual) - Please review before scoring.

1.2 Human Toxicity

Substance	Air Standard (ug/m3)	Acute Toxicity		Chronic Toxicity		Carcinogenicity			
		Val.	(mg/kg)	Val.	(mg/kg/day)	Val.	WOE	PF	Val.
lead	0.5	10	ND	ND	ND	ND	ND	ND	ND
cadmium	0.00056	10	25	ND	ND	ND	B1	6.1	6
benzo(a)pyrene		10	ND	ND	ND	ND	B2	ND	ND
mercury		10	ND	ND	8.50E-05	8	ND	ND	ND

Source: 1,4  
 Highest Value: 10  
 2 Bonus Points? 2  
 Final Toxicity Value 12

1.3 Mobility (Use numbers to refer to above listed substances)

1.3.1 Gaseous Mobility

Henry's Law Constant: not applicable

Source: \_\_\_\_\_ Value: \_\_\_\_\_

1.3.2 Particulate Mobility

Soil type: Loamy sand  
 Erodibility: 134  
 Climactic Factor: 1-10

Source: 3 Value: 2

1.4 Highest Human Health Toxicity/Mobility Matrix Value (from Table A-7)  
 equals

Final Matrix Value: 12

1.5 Environmental Toxicity/Mobility

Source: 4

Substance	Non-human Mammalian Toxicity (mg/m3)		Mobility	Value	Matrix Value
	Value				
Cadmium	25 (rat)	10	partic.	2	10

1.5 Highest Environmental Toxicity/Mobility Matrix Value (from Table A-7) equals

Final Matrix Value 10

1.6 Substance Quantity:

Explain basis approximately 2 acres

Source: 1,3 Value: 7

## 2.0 MIGRATION POTENTIAL

2.1 Containment: Landfill; no cover

Source: 3 Value: 10

**WORKSHEET 5 ( CONTINUED)**

**AIR ROUTE**

**3.0 TARGETS**

3.1 Nearest Population: 1,000-2,000 feet

Source: 1,3 Value: 8

3.2 Distance to, and Name (s) of, Nearest Sensitive  
Environment (s) habitat for endangered species  
freshwater wetlan > 3000 to 4000 feet

Source: 1,3,7 Value: 3

3.3 Population within 0.5 miles:  
20 homes at 3 people per home = square root of 60 persons

Source: 7 Value: 8

**4.0 RELEASE**

Explain basis for scoring a release to air: None confirmed

Source: 1,3 Value: 0



## WORKSHEET 6 GROUND WATER ROUTE

### 1.0 SUBSTANCE CHARACTERISTICS

#### 1.1 Human Toxicity

Substance	Drinking Water Standard (ug/l)	Acute Toxicity		Chronic Toxicity		Carcinogenicity			
		Val.	(mg/kg-bw)	Val.	(mg/kg/day)	Val.	WOE	PF	Val.
lead	5	8	ND	ND	ND	ND	B2	ND	ND
cadmium	5	8	225	5	0.0005	5	B1	ND	ND
benzo[a]anthracene	0.2	10	ND	ND	ND	ND	B2	11.5	7
benzo[b]fluoranthene	0.2	10	ND	ND	ND	ND	B2	11.5	7
pcbs	0.5	10	1315	3	ND	ND	B2	7.7	6
mercury	2	8	ND	ND	0.0003	5	ND	ND	ND

Source: 1,3,4  
 Highest Value: 10  
 2 Bonus Points? 2  
**Final Toxicity Value:** 12

#### 1.2 Mobility (Use numbers to refer to above listed substances)

Source: 1,3,4 Value: 3

Solubility not applicable

Cations/Anions      cadmium      3  
                                  lead      2

#### 1.3 Substance Quantity

Source 1,3 Value: 5

Explain basis:      Approximately 30,000 cubic yards

### 2.0 MIGRATION POTENTIAL

2.1 Containment      landfill: No Liner (3), No cover (2),  
 Explain basis:      No leachate collection (2), No liquids (0)

Source: 1,3 Value: 7

2.2 Net Precipitation (N-A):Total (42) - Evap (5) = 37 inches

Source: 3,5c Value: 4

2.3 Subsurface Hydraulic Conductivity: gravelly sand, silty sand

Source: 1,3,8 Value: 3

2.4 Vertical Depth to Ground Water: >0-25

Source: 3, 8 Value: 8

### 3.0 TARGETS

3.1 Ground Water Usage: Public and private supplies with alternates available Source: 3, 7, 9 Value: 4

3.2 Distance to Nearest Drinking Water Wel > 1,300 -2,640 feet Source: 3, 7, 9 Value: 3

3.3 Population Served within 2 Miles: Greater than 10,000 Source: 3, 7, 9 Value: 100

**WORKSHEET 6**  
**GROUND WATER ROUTE (CONTINUED)**

3.4 Area Irrigated by (Groundwater) Wells NO AREA IRRIGATED Source: NA Value: 0  
within 2 miles:

**4.0 RELEASE**

Explain basis for scoring a release to ground water: None Source: 1,3 Value: 0

**Sources Used in Scoring**

1. Bremerton-Kitsap County Health District Site Visits and Site Sampling Reports
2. Kitsap County Stormwater Management Ordinance and Design manual, April 1997.
3. Washington Department of Ecology, WARM Scoring Manual, April, 1992.
4. Washington Department of Ecology, Toxicology Database for Use in Washington Ranking Method
- 5A. Kitsap County Groundwater Management Plan, Volume I, July 1989.
- 5B. Kitsap County Groundwater Management Plan, Volume II, April 1991.
- 5C. Kitsap County Groundwater Management Plan, Volume III, April 1996
6. BKCHD GIS system for Kitsap County topographic information
7. EPA Site Info, April 2001
8. Soil Survey of Kitsap County Area, WA, United States Department of Agriculture, Soil Conservation Service, September 1980
9. Bremerton-Kitsap County Health District Well Log Database, 2001
10. Washington State Department of Ecology, Model Toxics Control Act Cleanup Levels and Risk Calculations Update August 2001.

**PATHWAY SCORING FORMULAE WITH WEIGHTING AND  
NORMALIZATION FACTORS**

**Air Route - Human Health Pathway**

$$\text{AIR} = (\text{SUB} \times 60/329) \times \{\text{REL} + (\text{TAR} \times 35/85)\} / 24 = \underline{9.71}$$

where AIR = Pathway score for Air-Human Health =

$$\text{SUB} = (\text{Human Toxicity Value} + 5) \times (\text{Containment} + 1) + \text{Substance Quant} \quad \underline{194}$$

$$\text{REL} = \text{Release to Air} = \underline{0}$$

$$\text{TAR} = \text{Nearest population} + \text{Population within 1/2 mile} = \underline{16}$$

**Air Route - Environmental Pathway**

$$\text{AIR} = (\text{SUB} \times 60/329) \times \{\text{REL} + (\text{TAR} \times 35/85)\} / 24 = \underline{19.60}$$

where AIR = Pathway score for Air-Environmental =

$$\text{SUB} = (\text{Env. Toxicity Value} + 5) \times (\text{Containment} + 1) + \text{Substance Quantity} \quad \underline{172}$$

$$\text{REL} = \text{Release to Air} = \underline{0}$$

$$\text{TAR} = \text{Nearest Sensitive Environment} = \underline{3}$$

**Surface Water Route - Human Health Pathway**

$$\text{SW} = (\text{SUB} \times 40/175) \times \{(\text{MIG} \times 25/24) + \text{REL} + (\text{TAR} \times 30/115)\} / 24 = \underline{45.15}$$

where SW = Pathway Score for Surface Water-Human Health =

$$\text{SUB} = (\text{Human Toxicity} + 3) \times (\text{Containment} + 1) + \text{Substance Quantity} = \underline{173}$$

$$\text{MIG} = \text{Soil Permeability} + \text{Annual Precip.} + \text{Rainfall Frequency} + \text{Floodplain} + \text{Slope} = \underline{19}$$

$$\text{REL} = \text{Release to the Surface Water} = \underline{5}$$

$$\text{TAR} = \text{Distance to Surface Water} + \text{Population Served by Surface Water} + \text{Area Irrigated} = \underline{10}$$

Table 2 (Continued)

Surface Water Route - Environmental Pathway

$$SW = (SUB \times 40/175) \times \{(MIG \times 25/24)\} + REL + (TAR \times 30/115) / 24 = \underline{76.99}$$

where SW = Pathway Score for Surface Water-Environmental =

$$SUB = (Env. Toxicity + 3) \times (Containment + 1) + Substance Quantity = \underline{129}$$

$$MIG = Soil Permeability + Annual Precip. + Rainfall Frequency + Floodplain + Slope = \underline{19}$$

$$REL = Release to the Surface Water = \underline{5}$$

$$TAR = Distance to Nearest Surface Water + Distance to Fisheries Resource + Distance to Sensitive Environment = \underline{34}$$

Ground Water Route - Human Health Pathway

$$GW = (SUB \times 40/208) \times \{(MIG \times 25/17) + REL + (TAR \times 30/165)\} / 24 = \underline{49.56}$$

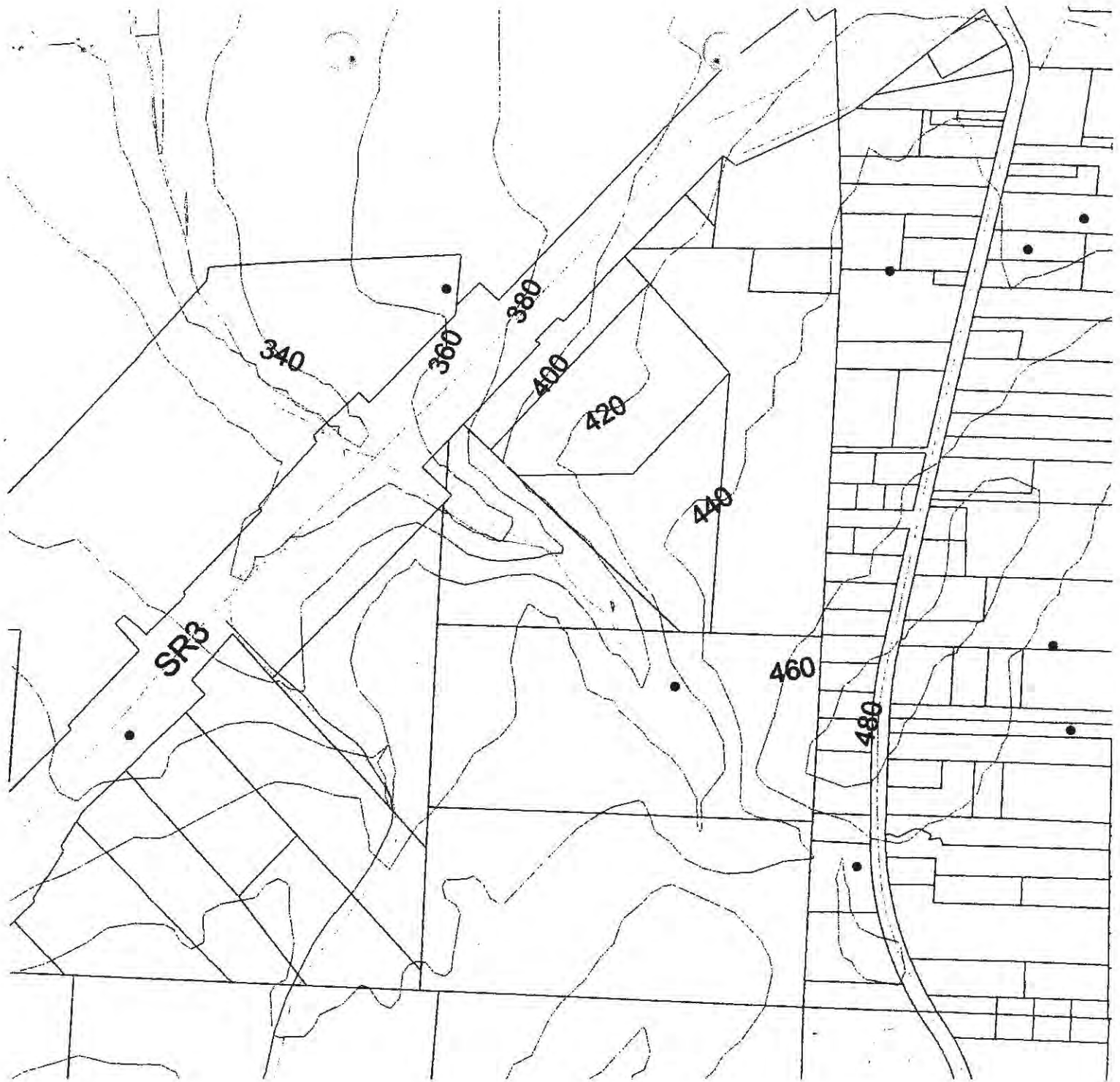
GW = Pathway Score For Ground Water-Human Health =

$$SUB = (Human Toxicity + Mobility + 3) \times (Containment + 1) + Substance Quantity = \underline{149}$$

$$MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity = \underline{15}$$

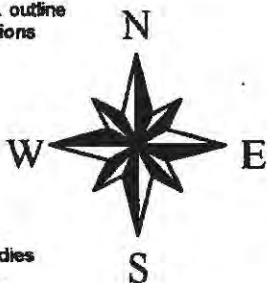
$$REL = Release to the Ground Water = \underline{0}$$

$$TAR = Aquifer Use + Well Distance + Population Served + Area Irrigated = \underline{107}$$

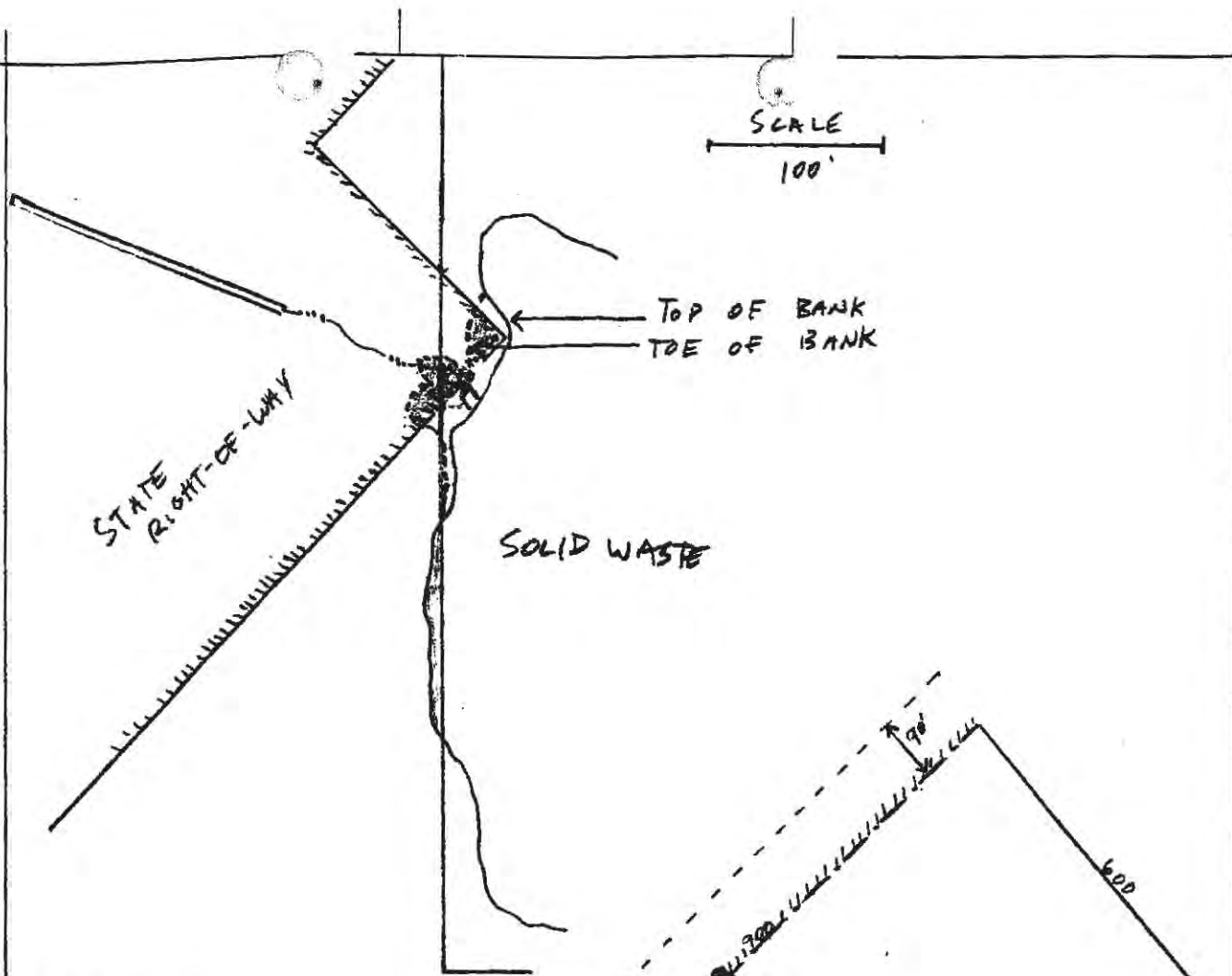


500 0 500 1000 1500 2000 2500 Feet

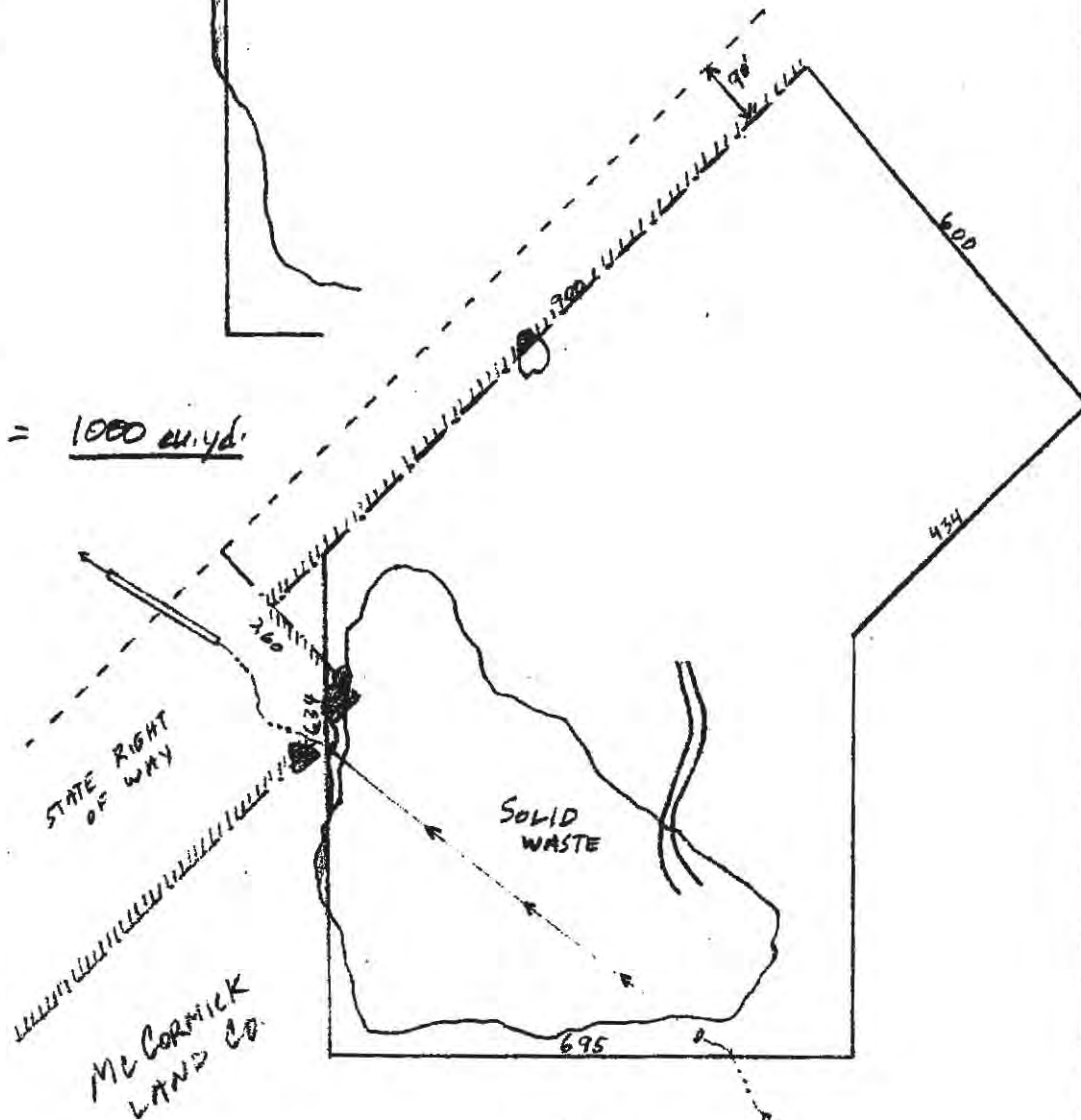
- Topography
- Kitsap Co. outline
- Well locations
- Streams
  - 1
  - 2
  - 3
  - 4
  - 5
  - 9
- Roads
- Parcels
- Water Bodies
- Wetlands



# **Bremerton Auto Wrecking Landfill -1/10/02**



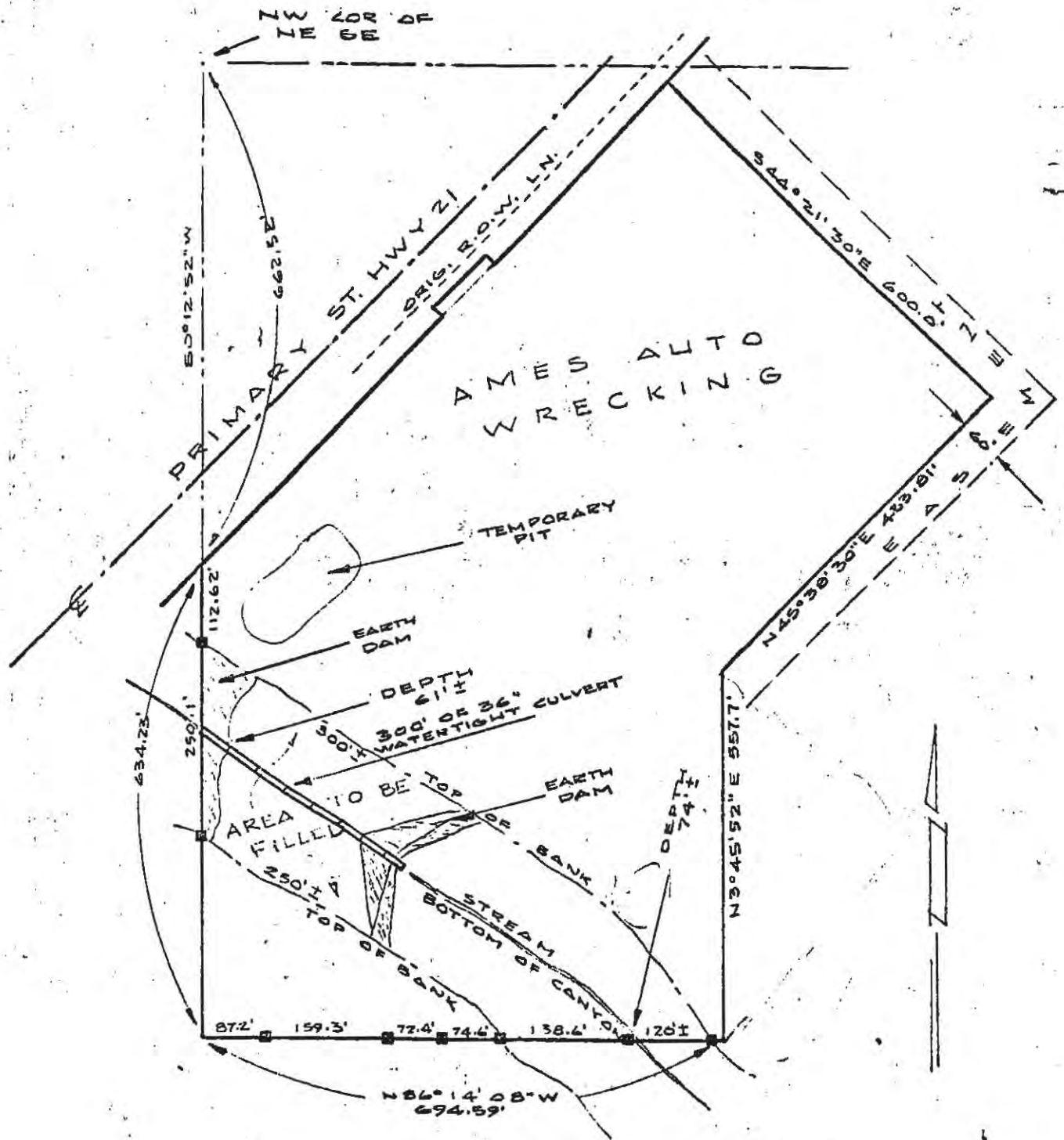
APPROX. VOL  
SOLID WASTE = 1000 cu. yd.  
TO REMOVE

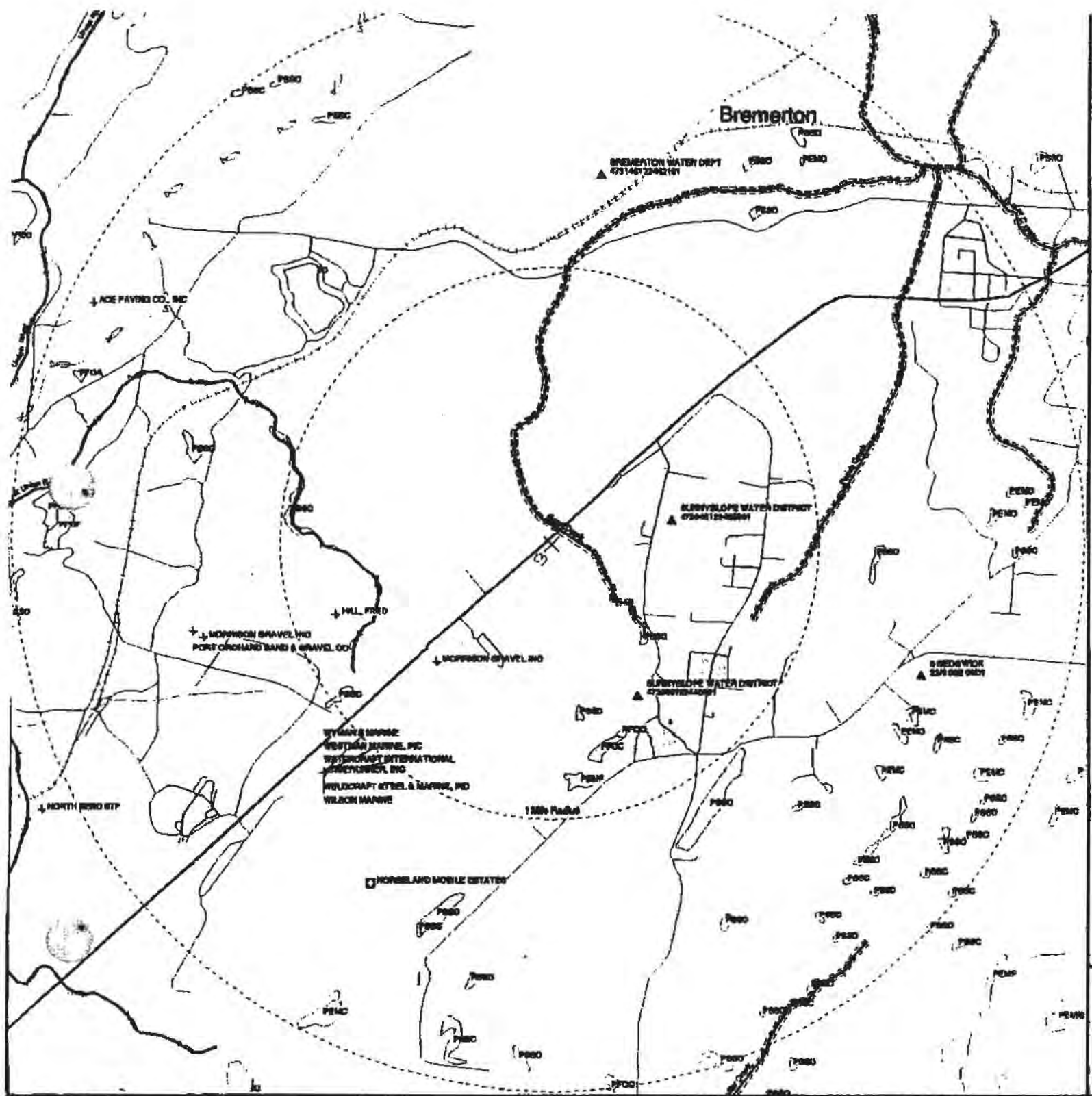




SKETCH OF PORTION OF  
NE 1/4 SE 1/4

SECTION 1 TOWNSHIP 23 NORTH, RANGE 1 WEST, W.M.  
SCALE 1" = 200'





# Bremerton Auto Wrecking Landfill

## SHA Investigation

Lat: 47 30 36 Long: 122 44 28  
KITAP County, WA

This computer representation has been compiled by the U.S. Environmental Protection Agency (EPA) from sources which have supplied data or information that has not been verified by the EPA data is offered here as a general representation only, and is not to be used for commercial purposes without verification by an independent professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.

## LEGEND

Note: Facility labeling turned off for categories with more than 60 points.  
Some facilities without good addresses may plot at zip code centroids.  
Facility points have been restricted to near specified areas.

- ☐ CERCLIS NPL Site
- ☐ CERCLIS NPL Site (Proposed)
- ☐ CERCLIS Deleted From NPL Final Site
- ☐ CERCLIS Part of NPL Final Site
- ☐ CERCLIS Non-NPL Site Many located by zip code
- ☐ Archived from CERCLIS
- ☐ RCRA TSD or LQG Site (Others Excluded)
- ☐ EPCRA T6 Site (Toxic Release Inventory)
- ☐ PCB Facility Site
- ☐ AFSARS Site
- ☐ Public Ground Water Supply Well
- ☐ Public Surface Water Supply Intake
- ☐ Major Roads and Highways
- ☐ Other Roads
- ☐ National Park/Recreation
- ☐ Wetlands / Washington An (National Wetland Inventory)
- ☐ Streams - Not Classified
- ☐ Streams - Low Value For Resident Fish Area
- ☐ Streams - Moderate Value For Resident Fish Area
- ☐ Streams - Substantial Value For Resident Fish Area
- ☐ Streams - Outstanding Value For Resident Fish Area
- ☐ Stream - Critical Species or Spawning Area
- ☐ Stream - Anadromous Fish Passage
- ☐ County Boundary

## 1990 Population Density Per Sq Mi

- ☐ Under 10
- ☐ 10 - 100
- ☐ 100 - 1,000
- ☐ 1,000 - 3,000
- ☐ 3,000 - 6,000
- ☐ 6,000 - 10,000
- ☐ 10,000 - 20,000
- ☐ Over 20,000

